Claims

1. Device for inspecting test objects (3) having

- an X-ray beam tube (1) with a small field of view in relation to the horizontal extent of the area of the test object to be examined,

- a detector (2) with a small field of view in relation to the horizontal extent of the area to be examined,

characterized in that the device is constructed in such a way that the test object (3) is stationary during the inspection process while the X-ray beam tube (1) and the detector (2) are arranged moveably within the X-Y plane for inspecting the entire area of the test object to be examined.

2. Device as in claim 1, characterized in that the test object (3) is attached to a carrier that remains stationary during the inspection of the test object.

3. Device as in claim 1 ~~or 2~~, further characterized in that a computing device is connected to the detector (2).

4. Device as in claim 3, further characterized in that an analysis unit is connected to the computing device.

5. Device as in ~~one of claims 1 to 4~~ claim 1, characterized in that the X-ray beam tube (1) is a microfocus tube with a focal spot diameter of 10 to 40 µm.

6. Device as in ~~one of claims 1 to 5~~ claim 1, characterized in that the detector (2) is a CCD chip arranged on a taper.

7. Device as in ~~one of claims 1 to 6~~ claim 1, characterized in that it is suitable for two-dimensional examination of test objects (3).

8. Device as in claim 7, characterized in that it is suitable for three-dimensional examination of test objects (3).

A 9. Device as in ~~one of claims 1 to 8,~~ claim 1 characterized in that the test objects are printed circuit boards and/or loaded printed board assemblies.

A 10. Use of the device as in ~~one of claims 1 to 9~~ claim 1 for X-ray inspection of soldered joints on printed circuit boards and/or loaded printed board assemblies.

11. Use as in claim 10 for fully automated 100% X-ray inspection of soldered joints on printed circuit boards and/or loaded printed board assemblies.

A 12. Use as in claim 10, ~~if dependent upon claim 4,~~ characterized in that a set of testing algorithms is transmitted to the image analysis unit in learning mode and, with the aid of these algorithms, a characteristic vector is generated for an individual soldered joint that, with the vectors of this soldered joint from other printed circuit boards and/or loaded printed board assemblies, will be optimized so that the resulting characteristic vector will statistically represent a defect-free soldered joint.

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13. Use as in claim 12, characterized in that, in testing mode a pad image buffer, the set of testing algorithms, and the learned characteristic vectors with tolerances are transmitted to the image analysis unit, and in order to test a soldered joint, the correlation between the learned characteristic vectors with tolerances and the soldered joint under test is determined.

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